chapter **9**

Booting DOS Workstations from the Network

Chapter Overview

This chapter explains how to set up the network so that workstations (mostly diskless workstations) can boot from the Remote Boot disk image files stored on the NetWare server's hard disk.

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About RPL.NLM

RPL.NLM is a NetWare v3.11 loadable module that acts as a protocol stack and responds to the IBM architected Remote Program Load (RPL) frames as defined in the *IBM Remote Program Load User's Guide*.

It is used in networks that have diskless workstations installed with the RPL BIOS module. Currently, this is supported on the following network adapters:

- IBM Ethernet adapters (MCA and Model 25SX adapters)
- IBM PC Network adapters
- IBM Token-Ring Network adapters
- Novell adapters and the OEM adapters with the Enhanced Remote Boot PROM installed

Specifically, RPL.NLM will respond to the frames as shown in Table 9-1.

Table 9-1
RPL frame response

RPL.FRAME	RPL.NLM Response
FIND	FOUND
SEND.FILE.REQUEST	FILE.DATA.RESPONSE

Features of RPL.NLM

RPL.NLM comes with five bootstrap programs:

- ETHER.RPL for networks using the IBM Ethernet adapter.
- F1ETH.RPL for IBM adapters.
- PCN2L.RPL for networks using the IBM PC Network adapter.
- TOKEN.RPL for networks using the IBM Token-Ring adapter.
- RBOOT.RPL for Novell adapters and OEM adapters with the Enhanced Remote Boot PROM.

Together, these files offer the following features and fixes:

- The ability to use BOOTCONF.SYS wildcard characters (* and ?) in specifying node addresses. Also, more than one disk image file name is allowed per node address. BOOTCONF.SYS is parsed by RPL.NLM at the NetWare server to minimize the amount of network traffic.

  See “RPL Parameters and Extensions” on page 141 for a complete description of how to use these features.

- The ability to boot across a Source Routing Bridge.

Running RPL with Enhanced Remote Boot PROMS

What You Need

To install the disk image files on the NetWare server, you need the following:

- A worksheet to record settings for node address and network address
- A workstation with a floppy or hard disk drive
- The boot diskettes for each remote boot workstation

1. Install RPL.NLM on the NetWare server

Use the SYS:\SYSTEM directory. Type

```
LOAD RPL
```

at the server console.

2. Ensure Bootstrap Program files Are in the SYS:\Login Directory

The following bootstrap programs come with RPL.NLM and should be installed in the SYS:\LOGIN directory of the NetWare server:

Bootstrap program	Adapter type
ETHER.RPL	IBM MCA Ethernet
F1ETH.RPL	IBM Model 25SX Ethernet
PCN2L.RPL	IBM PC Network
TOKEN.RPL	IBM Token-Ring Network
RBOOT.RPL	Adapters using Novell Boot ROM Kit

3. Bind RPL.NLM to the Network Board

Since RPL.NLM is a protocol stack, it must be bound to all network boards that have RPL clients attached to them.

To bind the board, type

```
BIND RPL TO BOARD
   [ACK],[FRAME=ff],[GNS],[NODEFAULT],
   [PROTECT],[PS=server],[TRO],[WAIT
   TIME=sss]
```

where BOARD is the name of any NetWare LAN driver that is configured for IEEE 802.2 frame type.

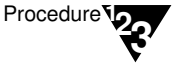
See “RPL.NLM BIND Time Parameters” on page 141 for a complete description of the parameters you can use.

4. Create a Single or Multiple Remote Boot Disk Image File(s)

If you want to create a single Remote Boot disk image file for a single workstation, see “Creating a Single Remote Boot Disk Image File” on page 61.

If you need to create multiple Remote Boot disk image files for workstations using different network boards, or operating environments, see “Creating Multiple Remote Boot Disk Image Files” on page 63.

Creating a Single Remote Boot Disk Image File



1. Boot a workstation from floppy or hard disk, and log in as SUPERVISOR.
2. Insert the boot diskette for the Remote Boot workstation into drive A:.
3. Map drive F: to SYS:SYSTEM. Type

   `MAP F:=SYS:SYSTEM` <Enter>
4. Map drive G: to SYS:LOGIN. Type

   `MAP G:=SYS:LOGIN` <Enter>
5. Change to the SYS:LOGIN directory. Type

   `G`: <Enter>
6. Run DOSGEN. Type

   `F:DOSGEN` <Enter>

Your screen will look similar to Figure 9-1.

Figure 9-1
Single disk image file screen

```
Floppy Type f9 = Quad Density, 15 Sectors per track
       Total Floppy Space 2400 Sectors
       Setting Up System Block
       Setting Up FAT Tables
       Setting Up Directory Structures
       Traversing Directory Structures
       Processing IO SYS
       Processing MSDOS COM
       Processing COMMAND COM
       Processing IPXODI COM
       Processing LSL COM
       Processing NE1000 COM
       Processing VLM
       Processing NET CFG
       Processing AUTOEXEC BAT
       Transferring Data to NET$DOS.SYS
```

DOSGEN creates a disk image file called NET$DOS.SYS (a copy of the files on the boot diskette) in the SYS:LOGIN directory.

7. Copy the AUTOEXEC.BAT file from the boot diskette into the SYS:LOGIN directory and into the default directory specified in the user's login script.

   You may get a "Batch file missing" error when you log in if the AUTOEXEC.BAT file is not copied to *both* the SYS:LOGIN directory and the default directory.

8. Flag the NET$DOS.SYS file in SYS:LOGIN as Shareable. Type

   FLAG NET$DOS.SYS S <Enter>

Creating Multiple Remote Boot Disk Image Files

You must create different boot image files on the NetWare server for each Remote Boot workstation that has different boot file requirements.

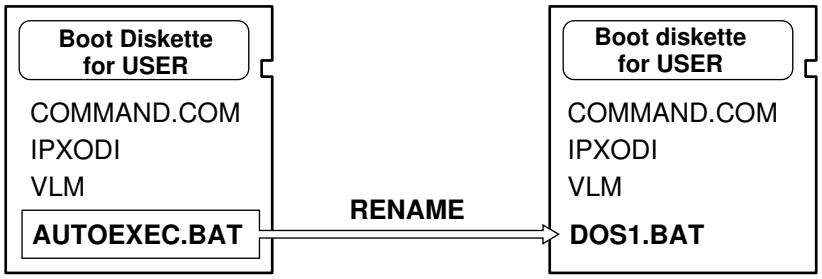
For every boot image file, rename NET$DOS.SYS file to a unique name

Procedure

1. Boot a workstation from a floppy or hard disk, and log in as SUPERVISOR.
2. Rename the AUTOEXEC.BAT file on each boot diskette to a unique name and give a .BAT extension. See Figure 9-2.

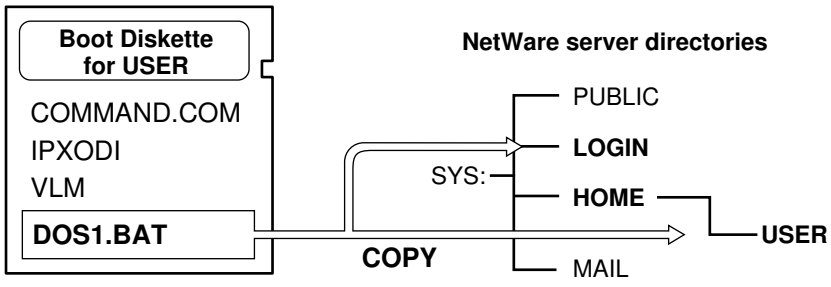
   List this information, with the network addresses and node addresses, on your worksheet. You need this information to create the BOOTCONF.SYS file.

Figure 9-2
Rename the AUTOEXEC.BAT file



3. Copy the renamed .BAT file (DOS1.BAT, in this example) from the boot diskette into the SYS:LOGIN directory. See Figure 9-3.

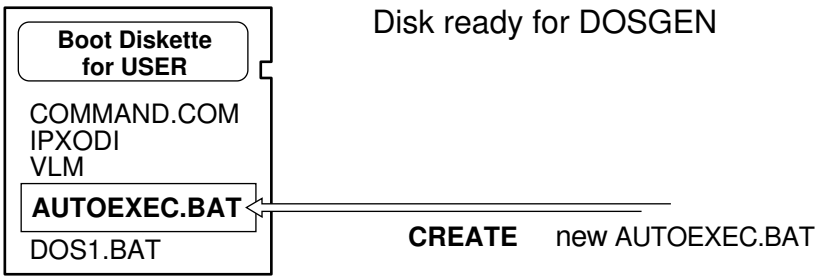
Figure 9-3
Copy the renamed .BAT file



4. Copy the renamed .BAT file (DOS1.BAT) into the default directory specified in the login script.

5. Create a new AUTOEXEC.BAT file on each boot diskette to execute the renamed batch file. See Figure 9-4.

Figure 9-4
Create a new AUTOEXEC.BAT file



6. Map drives to the directories that DOSGEN writes to

   6a. Map drive F: to SYS:SYSTEM.

   `MAP F:=SYS:SYSTEM` <Enter>

   6b. Map drive G: to SYS:LOGIN.

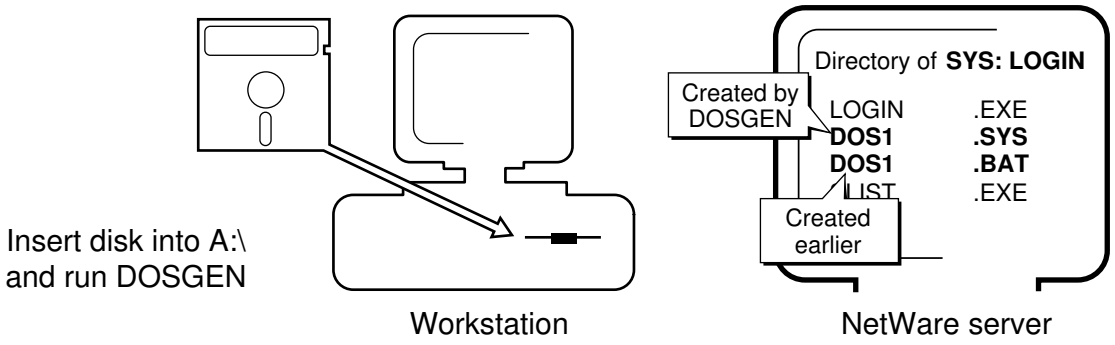
   `MAP G:=SYS:LOGIN` <Enter>

   6c. Change to the SYS:LOGIN directory.

   `G:` <Enter>

7. Use DOSGEN from the ***WSDOS_1*** diskette to create a uniquely named .SYS file in the SYS:LOGIN directory for each boot diskette. See Figure 9-5.

Figure 9-5
Run DOSGEN to create a .SYS file



7a. From drive G: (and with the boot diskette in drive A:), type a command similar to the following:

F:DOSGEN A: DOS1.SYS <Enter>

DOSGEN creates the new disk image file in the SYS:LOGIN directory. Your screen will look similar to Figure 9-6.

Figure 9-6
Multiple disk image file screen

```
Floppy Type f9 = Quad Density, 15 Sectors per track
       Total Floppy Space 2400 Sectors
       Setting up System Block
       Setting Up FAT Tables
       Setting Up Directory Structures
       Traversing Directory Structures
       Processing IO SYS
       Processing MSDOS COM
       Processing COMMAND COM
       Processing IPXODI COM
       Processing LSL COM
       Processing NE1000 COM
       Processing VLM
       Processing NET CFG
       Processing AUTOEXEC BAT
       Transferring Data to DOS1.SYS
```

7b. Record the network number and node address of the workstation that will use the Disk Image file you just created.

You'll use this information when you create the BOOTCONF.SYS file.

When you have finished running DOSGEN for two boot diskettes, your list will look similar to the following:

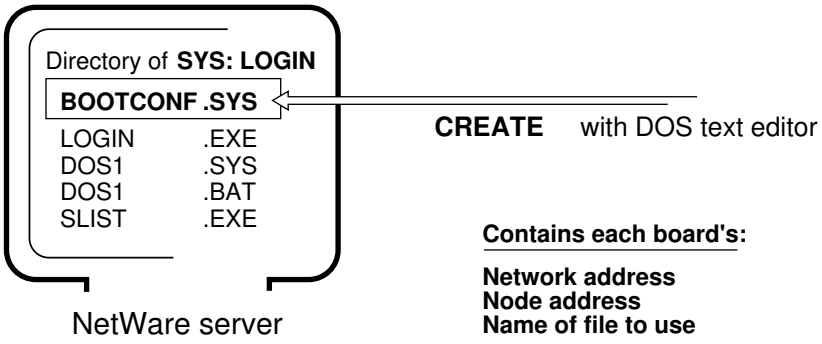
```
DOS1.SYS: Network#=DOC20 Node=5a003b77
DOS2.SYS: Network#=DOC20 Node=1b0276a3
```

7c. Repeat steps 7a and 7b for each boot diskette.

8. Create a BOOTCONF.SYS file in the SYS:LOGIN directory. See Figure 9-7.

The BOOTCONF.SYS file tells the workstation which boot image file to use.

Figure 9-7
Create a BOOTCONF.SYS file



When you create multiple Remote Boot disk image files, you also need a BOOTCONF.SYS file in the SYS:LOGIN directory that lists

- All custom Remote Boot disk image files. (This doesn't include the default NET$DOS.SYS file.)
- The network address and node address of each workstation that uses the customized boot image files.

Add the new entries to the existing file through your DOS text editor.

8a. Move to the SYS:LOGIN directory.

8b. Use a DOS text editor to create the BOOTCONF.SYS file in the SYS:LOGIN directory.

Include a line for each Remote Boot image file you created, using an entry format containing the following information:

- 0x (the number zero plus x)
- The network address
- A comma (,)
- The node or station address
- An equal sign (=)
- The boot disk image filename

An example for two boot diskettes follows:

```
0xDOC20,5a003b77=DOS1.SYS [RPL.NLM BIND
  Override Parameters for this node]
0xDOC20,1b0276a3=DOS2.SYS [RPL.NLM BIND
  Override Parameters for this node]
```

See “RPL.NLM BIND Override Parameters in the BOOTCONF.SYS File” on page 144 for a complete description of the parameters you can use in the example above.

See “BOOTCONF.SYS Extensions” on page 146 for the following information:

- Using wildcard characters in the BOOTCONF.SYS file
- Specifying more than one disk image file per node address
- Allowing multiple lines per node address

9. Flag the .SYS files in SYS:LOGIN as Shareable.

   Type commands similar to the following:

   FLAG *.SYS S <Enter>
   FLAG *.BAT S <Enter>

Running RPL with Older Remote Boot ROMS

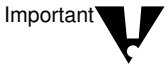
If you use the older Remote Boot ROMS, modify the steps described for running RPL on Enhanced Remote Boot ROMS described in the sections that follow:

For Single Remote Boot Image Files

See “Creating a Single Remote Boot Disk Image File” on page 61 for instructions.

For Multiple remote Boot Image Files

See “Creating Multiple Remote Boot Disk Image Files” on page 63 for instructions.



You can’t use RPL.NLM BING override parameters in the BOOTCONF.SYS and BOOTCONF.SYS for older remote Boot PROMS.

Running RPLFIX.COM for Older ROMs with DOS Versions Higher than 5.*x*

RPLFIX allows workstations to remote program load (RPL) properly with DOS 5.*x* and above. Run it after you create the boot image file. RPLFIX modifies the boot image file, so you only need to run it once.

The remote workstation may hang during the reset process if you are resetting using DOS 5.*x* or above and the boot image file hasn’t been modified by RPLFIX.

How to Use RPLFIX

RPLFIX is found on the *WSDOS_1* diskette. After you locate RPLFIX.COM, map a drive to the LOGIN subdirectory that contains the boot image file (usually named NET$DOS.SYS). If you renamed your boot image file, you must use the new filename with RPLFIX:

RPLFIX [d:] *boot image file* <Enter>

Replace [*d*:] with the drive letter where the image file is located. Replace *boot image file* with the name of the file created with the DOSGEN utility.

If the drive you mapped to SYS:LOGIN was drive F:, you would enter the following:

RPLFIX F:NET$DOS.SYS <Enter>

Troubleshooting RPL with Older ROMS

- If you get the error message "Error opening boot disk image file," you are probably attaching to another file server that does not contain the Remote Boot disk image file. Either log in to the other possible default file servers as SUPERVISOR and run DOSGEN on each, or copy the .SYS and .BAT files from the default file server to the other file servers on the network.
- If you get the error "Batch file missing," make sure the AUTOEXEC.BAT file is in

SYS:LOGIN	For every file server you could possibly attach to
Default (or first mapped drive)	For every file server you normally log in to

- If one user can log in but other users are unsuccessful when trying to log in at the same time, make sure the .SYS files are flagged Shareable and that users are assigned the Modify right to SYS:SYSTEM.
- If you are using a Remote Reset PROM on a Token-Ring network board and you can't boot a workstation, ensure that you have loaded the Remote Program Load loadable module (LOAD TOKENRPL.NLM) at the NetWare server console before booting the workstation.

- Use TRACK ON at the NetWare server console and watch for “Get Nearest Server Requests” from the workstation to determine if the boot PROM on the workstation is sending packets.

- Load MONITOR at the NetWare server console and watch to see if the workstation opens the BOOTCONF.SYS file, the NET$DOS.SYS file, or other boot disk image files.

- If a workstation using the boot PROM doesn’t boot, and you have another workstation with a diskette drive configured the same as the first workstation (has the same type of network board using the same configuration options), see if the second workstation will boot with the boot diskette you used with DOSGEN.

  Booting with the boot diskette on the second workstation should be the same as booting from the NetWare server on the first workstation.